

TECHNICAL MANUSCRIPT REVIEW FORM

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| Title "State-of-the-Science Report on Predictive Models and Modeling Approaches for Characterizing and Evaluating Exposure to Nanomaterials" | | Author(s) EPA/ORD John M. Johnston RTI International Stephen M. Beaulieu Michael I. Lowry Evan Bowles |
| Date Review Requested July 21, 2010 | Date Review Required August 16, 2010 | Project Officer/Organization/Address Dr. John M. Johnston EPA/NERL/ERD 960 College Station Rd Athens, GA 30605 |
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You are asked to review and comment on the attached manuscript. Feel free to make notations on the manuscript as well as in the comments section below, particularly regarding your recommendations for revisions. If you are unable to review the manuscript by the required date, please return it now. Your suggestions for alternate or additional reviewers will be welcomed.

| SUMMARY RATING | | | RECOMMENDATIONS |
|---|--------------|----------------|---|
| Please rate the manuscript as follows: | Satisfactory | Unsatisfactory | <input type="checkbox"/> (1) Acceptable as is <input checked="" type="checkbox"/> (2) Acceptable after minor revisions <input type="checkbox"/> (3) Acceptable after major revisions <input type="checkbox"/> (4) Not acceptable If you have checked either 3 or 4, please specifically state reasons(s) in the comments space below. |
| Content & scope | ✓ | | |
| Organization & presentation | ✓ | | |
| Quality of data & validity of analytical techniques | ✓ | | |
| Soundness of Conclusions | ✓ | | |
| Editorial Quality | ✓ | | |
| Other (specify) | | | Reviewer's Signature: <i>Chloe Hendren</i> Date: 8/16/10 |

Comments: (Use extra sheets if needed): *Comments embedded in attached pdf, named "Nanomaterials_SOTS_Report-CHendren edits.pdf"*

Christine Ogilvie Hendren

8/16/2010

Response to the Charge for Reviewers

1. Is the report written in a clear, concise, and readable manner? If not, please provide comments.

Overall the report is clear and organized in such a way to lead the reader through the myriad of concepts necessary to understand environmental modeling and nanomaterials, then step by step through models that have been, cannot be, or could be applied to nanomaterials.

There are some places where I thought additional clarity could be achieved, or where introduction of concepts could be smoothed out. These are noted in comments within the text. Overall I did not feel any major rearrangement would be required; all of these issues were specific to a paragraph or small section.

Issues that pertain to the document as a whole are listed here:

- a. 'NMs' or nanomaterials – within NCEA at the EPA and within CEINT at Duke University, we have been making sure to distinguish engineered nanomaterials from nano-scale materials in general, some of which may be created unintentionally (e.g. via combustion) or some of which may be naturally occurring in the environment. I suggest that for this document the primary consideration is the impact of those nanomaterials that are being intentionally created and potentially released to the environment, so adopting ENMs would help the nano community be internally consistent and drive toward greater accuracy of terms. Sometimes within this document manufactured NMs are specified, so I think just some attention to being very intentional about terms would help.
 - b. References – this may be a different type of document than I am accustomed to reading so perhaps the referencing meme here is appropriate to the function. However, it seemed to me that several of the claims or small conclusions stated during the course of the document could benefit from a reference. Several are noted specifically for example sake but it was more of a global comment.
 - c. "bulk" – at least within NCEA at EPA we have been trying to move away from using "bulk" to describe non-nano-scale materials, calling them instead "conventional" materials. This is to avoid confusion about the fact that nanomaterials can also be created and released in bulk – the word itself has been used extensively in literature we know, but since it refers to the collective rather than the size of an individual entity it's not very accurate.
2. Do the issues identified adequately address the breadth of potential fate, transport, and modeling issues related to multimedia modeling of nanomaterials in soil and water media?

For the most part the primary issues are identified within this report. Minor comments are included in the text. The one major issue that I felt could use elaboration is mentioned several times within my comments. I feel the document would greatly benefit from a section mentioning the fact that nanomaterials behave like chemicals and like particles, and that the sciences predicting the behavior of each of these are distinct from one another. This will help explain why some of the descriptors of conventional chemicals cannot be used to describe nanomaterials. I think many people in the field do not realize this core issue and it greatly helps clarify why there are such issues with nanomaterials specifically. New chemicals emerge all the time and we are not beset with problems in dealing with them, so why is nano that different?

3. Are there additional studies or other information that should be included in this report? If so, please cite or identify that information.

There is one study that is currently included in alternative model section 4.3.4 that needs to be removed as it includes unpublished formulae and diagrams. However, I believe this may be taken care of already in the changes that RTI was planning on introducing. Further comments on this can be seen in the text. Corrected information on the study as included here can be provided upon request – or I can point the team to the person who can help provide information on the study that seems to be targeted by the section title.

4. Do the identified research needs adequately address knowledge gaps about multimedia modeling of nanomaterials in soil and water media? Please identify any additional research gaps that you think should be identified.

This aspect of the report I found to be clearly presented and sectioned well so as not to overwhelm the reader.

5. Are you aware of critical literature references not included, but should have been included in the bibliography? If so, please list them.

I am not aware of critical references that should have been included.